REMARKS

As a preliminary matter, Applicant wishes to thank the Examiner for thorough examination of the present application as evidenced in the non-final Office Action dated December 17, 2010. The present Response is responsive thereto. Reconsideration and allowance are respectfully requested.

Drawings

The Office Action objected to the drawings as failing to comply with 37 CFR 1.84(p)(5) because they include the following reference character(s) not mentioned in the description: Figures 10A and 10B; items 214, 243, 255, 304, 305, 321 and 380. As presented above, drawings of the present application have been amended, wherein the reference character "214" in Fig. 10B has been replaced with "204"; the reference characters "243" and "255" as well as their indication lines in Fig. 3B have been removed; the reference characters "304" and "305" as well as their indication lines in Fig. 12B have been removed; the reference character "321" and its indication line in Fig. 14A has been removed. Besides, the reference character "380" has been added into the description based on the original PCT publication of the present application in Chinese, such as page 16, the fourth paragraph therein. And Applicant respectfully submits that the reference characters "Fig. 10A" and "Fig. 10B" are already mentioned in the description, such as page 12, lines 13-16 and page 19, lines 13-16 of the specification.

The Office Action objected to the drawings as failing to comply with 37 CFR 1.84(p)(5) because they do not include the following reference sign(s) mentioned in the description: items 300'. As presented above, the reference sign "300'" in the description has been deleted.

In addition, reference characters "265", "266", "261" and "262" have been added in Fig. 7, and corresponding amendment in the description has been made. This amendment is based on the original PCT publication of the present application in Chinese, such as figure 7 and page 14, the third paragraph therein.

By the above amendments, Applicant respectfully submits that drawings of the present application complies with 37 CFR 1.84(p)(5).

Claim Objections

The Office Action objected to claims 4, 5, 7, 8, 11, 13, 14, 17, 20 and 21 under 37 CFR 1.75(c) as being in improper form because a multiple dependent claim 1 to 3, 6, 9, 10, 12, 15, 18, 19 and 22. Applicant humbly reminds the Examiner that the multiple dependency defect of claims 4, 5, 7, 8, 11, 13, 14, 17, 20, 21, 23 and 24 have already been overcome in the preliminary amendment of the present application. Applicant respectfully submits that claims of the present application are currently in compliance with 37 CFR 1.75(c).

Claim Rejections - 35 USC § 103

The Office Action rejected claims 1-3, 7-9, 12-15 and 17-27 under 35 U.S.C. 103(a) as being unpatentable over Suzuki (U.S. 2003/0209375) in view of Guimarin (U.S. 5,612,606) and in further view of Hammerslag (U.S. 5,927,938). The Office Action rejected claims 10, 11 and 16 under 35 U.S.C. 103(a) as being unpatentable over Suzuki in view of Guimarin and in further view of Hammerslag as applied to claim 1, and in further view of Nor (U.S. 5,594,318). The Office Action rejected claims 4-6 under 35 U.S.C. 103(a) as being unpatentable over Suzuki in view of Guimarin and in further view of Hammerslag as applied to claim 1, and in further view of Parise (U.S. 2004/0142733). The rejection is respectfully traversed for reasons as follows.

Claim 1:

Claim 1 of the present application recites:

An electric public transit system, comprising

an electric driven bus equipped with a cassette battery set and a bus-mounted control system;

a charge station placed in a predetermined place for charging cassette battery sets; and

a loading and unloading apparatus; wherein

when the bus needs change the cassette battery set, the loading and unloading apparatus unloads the cassette battery set from the bus and loads a charged cassette battery set into the bus;

the charge station is equipped with a charge control system, and the loading and unloading apparatus is equipped with a loading and unloading control system;

the loading and unloading control system, the bus-mounted control system and the charge control system are able to intercommunicate;

whereby when the loading and unloading control system receives a signal sent from the bus-mounted control system of the bus that the bus will return to the charge station, the loading and unloading apparatus moves to a predetermined position corresponding to the bus at the charge station and waits; and

when the bus arrives at the predetermined position, the loading and unloading apparatus exchanges the cassette battery set with a charged cassette battery set, whereby the bus is able to operate on line continuously.

It can be seen that in the electric public transit system of claim 1, **the loading and unloading apparatus is equipped with a loading and unloading control system**, and the loading and unloading control system, the bus-mounted control system and the charge control system are able to intercommunicate, such that **when the loading and unloading control system receives a signal sent from the bus-mounted control system of the bus that the bus will return to the charge station, the loading and unloading apparatus moves to a predetermined position corresponding to the bus at the charge station and waits**; and when the bus arrives at the predetermined position, the loading and unloading apparatus exchanges the cassette battery set with a charged cassette battery set, whereby the bus is able to operate on line continuously.

Applicant respectfully submits that Suzuki, Guimarin and Hammerslag, either individually or in combination, do not teach the above features of claim 1 of the present application.

Firstly, none of Suzuki, Guimarin and Hammerslag teaches the loading and unloading apparatus is equipped with a loading and unloading control system.

Suzuki discloses an electrical vehicle energy supply system having an electrical vehicle which carries in a prescribed location a freely removable cassette-type battery and an energy supply station which has at all times a plurality of the cassette-type batteries and which performs charging processing of units of these batteries which include the number of batteries required by one such electrical vehicle, and performs the function of storing said batteries in a fully charged condition (see, e.g., abstract of Suzuki). In particular, Suzuki discloses "a cassette-type battery 2 of an electrical vehicle 1 that is located on the ground level being removed by a transport means 16 that uses a hydraulic lift, and an already-charged cassette-type battery 2 being pulled out from an appropriate shelf part 12 of the storage means 4 and installed in a prescribed location in the electrical vehicle 1" (see, e.g., paragraph [0104] and figure 9 of Suzuki). However, Suzuki does not teach the transport means using a hydraulic lift is equipped with a control system. In fact, Suzuki only teaches a main computer and a charging control computer in the electrical vehicle energy supply system (see, e.g., figure 5 of Suzuki), but does not teach the transport means itself is also equipped with a control system, that is, Suzuki does not teach the loading and unloading apparatus is equipped with a loading and unloading control system.

Guimarin discloses an integrated electric vehicle service station system for managing the exchange of heavy and bulky battery assemblies in electric vehicles (see, e.g., abstract of Guimarin). Guimarin teaches a control system in an exchange substation, for example, "The exchange station apparatus is preprogrammed with the positions of the battery platforms and vehicle dimensions for the sensed vehicle make and model, and the lift and/or vehicle are automatically moved to bring them into alignment" (see, e.g., column 12, lines 61-65 of

Guimarin)". However, Guimarin does not teach the loading and unloading apparatus, such as the lift, is equipped with a control system. Therefore, Guimarin does not teach the loading and unloading apparatus is equipped with a loading and unloading control system.

Hammerslag discloses a battery transfer and charging system for electrically powered vehicles which includes a conveyor loop for conveying batteries from a battery receiving station to a battery delivery station (see, e.g., abstract of Hammerslag). Particularly, Hammerslag discloses "a hydraulic ram 20 or other shifting means is utilized, in combination with drive sprockets which engage with notches on the batteries (as described below), to shift a charged battery from the conveyor and into the vehicle V" (see, e.g., column 5, lines 15-19 and figures 1 and 3 of Hammerslag). It can be seen that the loading and unloading apparatus in Hammerslag is mechanical, and is not equipped with a control system. Therefore, Hammerslag does not teach the loading and unloading apparatus is equipped with a loading and unloading control system.

Secondly, none of Suzuki, Guimarin and Hammerslag teaches the loading and unloading control system, the bus-mounted control system and the charge control system are able to intercommunicate; whereby when the loading and unloading control system receives a signal sent from the bus-mounted control system of the bus that the bus will return to the charge station, the loading and unloading apparatus moves to a predetermined position corresponding to the bus at the charge station and waits; and when the bus arrives at the predetermined position, the loading and unloading apparatus exchanges the cassette battery set with a charged cassette battery set, whereby the bus is able to operate on line continuously.

The Office Action concedes that Suzuki does not disclose these features. The Office Action asserts that these features are taught by Guimarin and Hammerslag.
It can be seen from the above features of claim 1 that the loading and unloading control system is capable of communicating with the bus-mounted control system, such that when the bus will return to the charge station, the bus-mounted control system of the bus can send a signal to inform the loading and unloading control system, to let the loading and unloading

apparatus move to a predetermined position corresponding to the bus at the charge station and wait for the return of the bus, thereby ensuring the rapid exchange of the battery of the bus and the continuous operation of the bus.

As stated above, neither Guimarin nor Hammerslag teaches a loading and unloading control system, let alone a loading and unloading control system that is capable of communicating with a bus-mounted control system.

Besides, neither Guimarin nor Hammerslag teaches "when the loading and unloading control system receives a signal sent from the bus-mounted control system of the bus that the bus will return to the charge station, the loading and unloading apparatus moves to a predetermined position corresponding to the bus at the charge station and waits". Guimarin discloses a mechanism for determining the alignment of the spent battery platform as it is removed from the vehicle, recording that alignment, and aligning the fresh battery platform with the removed spent platform (see, e.g., column 11, lines 13-19 of Guimarin). In an alternative of an embodiment of such alignment mechanism, "the make and model of the vehicle are automatically communicated to the exchange substation, which then automatically moves the lift and the vehicle until the two are in proper registration with one another. The exchange station apparatus is preprogrammed with the positions of the battery platforms and vehicle dimensions for the sensed vehicle make and model, and the lift and/or vehicle are automatically moved to bring them into alignment" (see, e.g., column 11, lines 20-21, column 12, lines 57-65 and figure 11 of Guimarin). It can be seen that in Guimarin, the lift and/or vehicle can be ***automatically aligned in the exchange substation*** through communication between the vehicle and the ***exchange substation***. However, Guimarin does not teach a battery exchange mechanism that "when the **loading and unloading control system** receives a signal sent from the bus-mounted control system of the bus that **the bus will return to the charge station**, the loading and unloading apparatus **moves to a predetermined**

position corresponding to the bus at the charge station and **waits**" as defined in claim 1 of the present application.

In the battery transfer and charging system of Hammerslag, battery information is stored, for example, "With reference to FIG. 5A, the centralized database 40 is accessed by the respective computers of multiple, geographically-distributed battery charging and transfer stations 42… the database includes battery tracking and history information ("history data") which is stored, on a battery-specific basis, in association with the unique ID codes of the batteries. For each battery, this information may include, for example, the number of times the battery has been recharged, the date of first use within a vehicle, and the current location (e.g., charging station or vehicle) of the battery. When a given battery is located within a vehicle, the location information may include information about vehicle (such as a vehicle ID number) and/or the vehicle's driver (such as the driver's credit card number). Updates to the database 40 are made remotely from the battery charging/transfer stations 42 by sending update requests across the network to the server associated with the database. These update requests are generated by the computers 37 of the individual stations in response to battery exchange operations… whenever a discharged battery is removed from a vehicle, the computer 37 of the respective station 42 reads the battery's ID code, and then accesses the centralized database to retrieve the battery's history data. The computer 37 then uses this information, in addition to the results of an electrical battery test, to determine whether or not the battery should be discarded or otherwise removed from the system" (see, e.g., column 6, lines 27-57 of Hammerslag). However, the storage and update of the battery information in a centralized database disclosed in Hammerslag has nothing to do with a battery exchange mechanism that "when the **loading and unloading control system** receives a signal sent from the bus-mounted control system of the bus that **the bus will return to the charge station**, the loading and unloading apparatus **moves to a predetermined position corresponding to the bus at the charge station** and **waits**" as defined in claim 1 of the present application.

Based on the above reasons, Suzuki, Guimarin and Hammerslag, either individually or in combination, do not teach the features "the loading and unloading apparatus is equipped with a loading and unloading control system; the loading and unloading control system, the bus-mounted control system and the charge control system are able to intercommunicate; whereby when the loading and unloading control system receives a signal sent from the bus-mounted control system of the bus that the bus will return to the charge station, the loading and unloading apparatus moves to a predetermined position corresponding to the bus at the charge station and waits; and when the bus arrives at the predetermined position, the loading and unloading apparatus exchanges the cassette battery set with a charged cassette battery set, whereby the bus is able to operate on line continuously" in claim 1 of the present application.

Further, the above features of claim 1 are not disclosed or taught by other cited art.

Nor discloses a method and apparatus for charging the traction battery of an electric vehicle (see, e.g., abstract of Nor). Nor mainly relates to the charging process of the vehicle battery, and does not disclose a loading and unloading control system or any feature relating to the communication between a loading and unloading control system and a bus-mounted control system.

Parise discloses a conductorless charging and power system for electronic appliances and method for communicating power to a power receiver employing wireless energy transmission (see, e.g., abstract of Parise). Parise mainly relates to wireless power transmission, and does not disclose any feature for exchanging the battery of a vehicle.

Thus both Nor and Parise fail to disclose the above features in claim 1 of the present application. And the above features of claim 1 are not common general knowledge in the art.

In addition, none of the cited prior arts (Suzuki, Guimarin, Hammerslag, Nor and Parise) recognizes the importance of providing continuous on-line services for an electric public transit system, nor do these prior arts contain any motivations and suggestions explicitly or implicitly of adding such feature in their systems. Lack of such a feature, an electric public transit system would not be practically functional. Without reading the disclosure of the

present invention, a person with ordinary skill in the art would not be motivated to modify Suzuki's electric vehicle energy supply system by adding the features as disclosed in the claim 1 of the present invention in view of Guimarin, Hammerslag, Nor and Parise. Therefore the claim 1 of the present invention clearly defined the problem that the prior arts fail to do either alone or in combination, and achieves the result of continuous on-line services for an electric public transit system.

In summary, the prior arts individually or in combination do not teach the technical scheme of claim 1 of the present invention nor do they contain any explicit or implicit motivations and suggestions to make such improvements. The subject matter of claim 1 would not have been obvious to a person having ordinary skill in the art when the invention was made. Hence claim 1 of the present application conforms to the provisions of 35 U.S.C. 103(a).

Claims 2-24:

Claims 2-24 are dependent upon claim 1. As claim 1 conforms to the provisions of 35 U.S.C. 103(a), Applicant respectfully submits that claims 2-24 of the present application are also in conformity with the provisions of 35 U.S.C. 103(a).

Claim 25:

Claim 25 defines a method for operating an electric public transit system, and recites, among other features, "sending a return signal from the bus to the charge station when the bus needs change the cassette battery set; moving a charged cassette battery set in the charge station to a predetermined position corresponding to the bus at the charge station, while the bus is returning to the charge station; and unloading the cassette battery set from the bus when the bus arrives at the predetermined position, and loading the charged cassette battery set waiting at the predetermined position into the bus; whereby the bus operates on line continuously".

For similar reasons as those stated above for claim 1, Applicant respectfully submits that the battery exchange mechanism defined by the above features of claim 25 is not taught by any of the cited art. The subject matter of claim 25 would not have been obvious to a person

having ordinary skill in the art when the invention was made. Thus claim 25 of the present application conforms to the provisions of 35 U.S.C. 103(a).

Claim 26:

Claim 26 is dependent upon claim 25. As claim 25 conforms to the provisions of 35 U.S.C. 103(a), Applicant respectfully submits that claim 26 of the present application is also in conformity with the provisions of 35 U.S.C. 103(a).

Claim 27:

Claim 27 defines a method for charging the cassette battery sets of the electric transit system of claim 1, and therefore, has included all the features in claim 1. For at least the same reasons as those stated above for claim 1, Applicant respectfully submits that claim 27 of the present application is also in conformity with the provisions of 35 U.S.C. 103(a).

Conclusion

In view of the foregoing it is believed that claims 1-27 of the present application are in condition for allowance and it is respectfully requested that the application be reconsidered and that all pending claims be allowed and the case passed to issue.

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